IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

CA, INC. and AVAGO TECHNOLOGIES INTERNATIONAL SALES PTE. LIMITED, Plaintiffs, v. NETFLIX, INC., Defendant.	NO. 2:21-cv-80 **PATENT CASE** **JURY TRIAL DEMANDED**

ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

Plaintiffs CA, Inc. ("CA") and Avago Technologies International Sales Pte. Limited ("Avago") file this Original Complaint ("the Complaint") for infringement of United States Patent Nos. 7,103,794 ("the '794 Patent"); 8,656,419 ("the '419 Patent"); 8,646,014 ("the '014 Patent"); 9,402,098 ("the '098 Patent"); and 10,911,938 ("the '938 Patent"), collectively the "Patents-in-Suit."

THE PARTIES

1. CA, Inc. is a Delaware corporation with its principal place of business located at 1320 Ridder Park Drive, San Jose, California 95131. CA maintains a place of business in this judicial district at 5465 S. Legacy Drive, Plano, Texas 75024.

2. Avago Technologies International Sales Pte. Limited is a corporation formed under the laws of Singapore with places of business at No. 1 Yishun Avenue 7, Singapore 768923 and 1320 Ridder Park Drive, San Jose, California 95131.

3. Defendant Netflix, Inc. is a Delaware corporation that maintains its principal place of business at 100 Winchester Circle, Los Gatos, California 95032.

4. Netflix has regular and established places of business throughout the world, including in Texas and within this judicial district. For nearly twenty years, Netflix has been registered to conduct business in Texas and has conducted such business continuously during at least that period.

5. Netflix may be served through its registered agent for service of process in Texas: CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201.

6. Netflix is a provider of streaming-digital-video services. Netflix streams videos of various types, such as films and television series, to over 158 million paid members in over 190 countries. Upon information and belief, Netflix designs, operates, tests, manufactures, uses, offers for sale, sells, and/or imports into the United States—including into the Eastern District of Texas—internet video streaming software, systems, and services that generate billions of dollars of revenue for Netflix each year.

JURISDICTION

7. Plaintiffs bring this civil action for patent infringement under the Patent Laws of the United States, 35 U.S.C. § 1 et. seq., including 35 U.S.C. §§ 271, 281–85. This Court has subject-matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338.

8. Netflix transacts and conducts business in this District and the State of Texas, and is subject to the personal jurisdiction of this Court. Plaintiffs' causes of action arise, at least in part, from Netflix's business contacts and activities in this District and elsewhere within the State of Texas. Netflix has committed acts of infringement in this District and within Texas by making, using, selling, offering for sale, and/or importing into the United States and this District

products, systems, and services that infringe one or more claims of the Patents-in-Suit. Further, Netflix induces others within this District to infringe one or more claims of the Patents-in-Suit.

VENUE

9. Venue is proper under 28 U.S.C. § 1400(b) because Netflix has committed acts of infringement in this District and has a regular-and-established place of business in this District.

10. Netflix is a multinational company that provides subscription services that permit its users to search for and to watch streaming video content over an internet connection. Netflix has a substantial presence in the District through the products and services Netflix provides residents of this District, including delivering digital video content.

11. Netflix uses a content delivery network called "Open Connect" to deliver Netflix content to its subscribers worldwide, including in this District. Netflix uses Open Connect to "deliver internet-based content (via HTTP/HTTPS) efficiently by bringing the content that people watch close to where they're watching it."[1]

12. The building blocks of Open Connect are "Open Connect Appliances" ("OCAs")—custom Netflix servers that store Netflix video content. OCAs "store encoded video/image bits and serve these bits via network connections to client devices."[2] Netflix installs OCAs "in significant Netflix markets throughout the world"[3] to "localize"[4] its video content and provides OCAs directly to local internet service providers ("ISPs") in the locations where Netflix subscribers live. Netflix "provide[s] the server hardware and the ISPs provide power, space, and

[1] https://openconnect.netflix.com/Open-Connect-Overview.pdf at 1.

[2] *Id.* at 2.

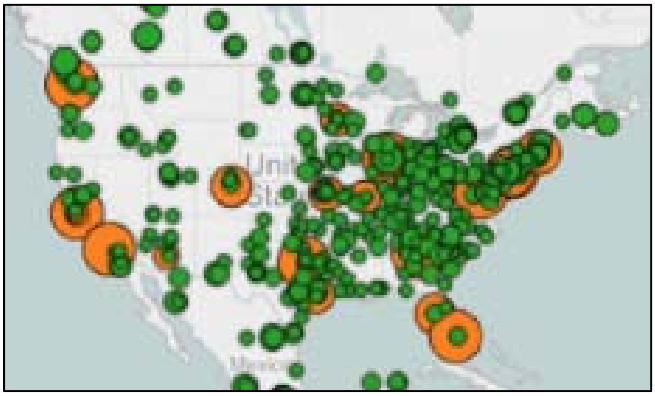
[3] *Id.*

[4] https://about.netflix.com/en/news/how-netflix-works-with-isps-around-the-globe-to-deliver-a-great-viewing-experience

connectivity."[5] Netflix's "traffic delivery is highly localized, [and] thousands of ISPs around the world enthusiastically participate."[6]

13. On information and belief, Netflix contracts with ISPs that offer Internet services to residents of this District and installs OCAs with those ISPs in physical facilities in this District.

14. On information and belief, the map below depicts locations of Netflix OCAs throughout the United States, including within this District, either installed directly by Netflix, or housed by ISPs in this District under contracts with Netflix.



Source: https://about.netflix.com/en/news/how-netflix-works-with-isps-around-the-globe-to-deliver-a-great-viewing-experience.

15. According to its website, Netflix retains control of its OCAs for deployment of streaming media directly to its customers, [7] including the substantial number of Netflix subscribers in this District. When Netflix engages with a new ISP, it confirms that the ISP meets Netflix's network requirements, contracts with the ISP, and ships and configures the OCA at the

[5] https://openconnect.netflix.com/Open-Connect-Overview.pdf

[6] https://about.netflix.com/en/news/how-netflix-works-with-isps-around-the-globe-to-deliver-a-great-viewing-experience

[7] *See* https://about.netflix.com/en/news/how-netflix-works-with-isps-around-the-globe-to-deliver-a-great-viewing-experience.

ISP's locations.[8] After installation, Netflix continues to control the OCA by monitoring, updating, and maintaining the OCA, as well as supplying it with specific video content.

16. On information and belief, Netflix's ISP partners in this District act as Netflix's agents in conducting Netflix's business in this District. Netflix, for example, requires its ISP partners to "identify a person or a set of people who are available to perform" specific business roles for Netflix at the ISP facility to "facilitate the overall process" of delivering streaming video to Netflix customers.[9] On information and belief, the ISPs work in cooperation with and at the direction of Netflix to operate the OCAs and the manner in which they deliver streaming video to Netflix clients. Netflix's OCA Deployment Guide, for example, explains that "the manner in which traffic is directed to the appliance is determined explicitly by you [i.e., the ISP] and Netflix, not by the appliance itself."[10] Similarly, an "OCA only serves clients at IP addresses that you [i.e., the ISP] advertise to the OCA via a BGP session. In other words, traffic is only delivered from your embedded OCAs to the customer prefixes that you explicitly announce to them . . . ."[11]

17. Netflix's OCAs located in physical facilities in this District deliver cached content to residents in this District. The physical servers located in facilities in this District are regular-and-established places of business of Netflix.

18. Netflix's infringement of the Patents-in-Suit is substantially related to its regular-and-established places of business in this District because Netflix's local servers provide video content to this District's residents.

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[8] *See* https://openconnect.netflix.com/en/#how-to-get-started.

[9] *See* https://openconnect.netflix.com/deploymentguide.pdf.

[10] *Id.*

[11] *Id.*

BACKGROUND

19. Both CA and Avago are indirect subsidiaries of Broadcom Inc., which is a global infrastructure technology leader built on over fifty years of innovation, collaboration, and engineering excellence. The company traces its roots to the pioneering innovations of leading companies like AT&T/Bell Labs, Lucent Technologies, and Hewlett-Packard/Agilent. In recent years, Broadcom has continued to broaden its technology base into additional areas that connect our world by combining with other industry leaders like LSI, Brocade, CA Technologies, and Symantec.

20. The companies that have united to further Broadcom's technology leadership, like CA, Symantec, and Avago, recognize that continued success depends in substantial part on its continuous innovation and attention to research and development. Through its subsidiaries, Broadcom spends billions of dollars each year on product research and development. These efforts have produced a wide range of novel technologies and inventions directed to advancing, among other things, semiconductor design, digital communications, digital content distribution, enterprise and data center networking, home connectivity, television set-top boxes, infrastructure software, and other inventions that provide important advancements in technology not only within the United States, but throughout the world.

21. Like most technology innovators, CA, Avago, and their affiliated companies rely on the patent systems of the United States and foreign countries to ensure that the innovations developed through their research-and-development efforts are protected from unauthorized use by others. Collectively, these companies hold tens of thousands of patents around the world.

22. Netflix was founded in 1997 as a company that sold and rented DVDs of movies through the mail. Not long thereafter, the company abandoned DVD sales to focus on its movie-

rental business. Netflix's business model was established in an effort to compete with brick-and-mortar video stores such as Blockbuster and others. Beginning in 1999, Netflix adopted a monthly subscription pricing model, where a Netflix subscriber would pay a monthly fee that allowed it to rent a certain number of DVDs at a time. A subscriber would submit a list of DVDs the subscriber wanted to rent, and Netflix would mail one or more of the DVDs to the subscriber. When the subscriber mailed back the DVD, Netflix would mail the next DVD on the subscriber's list.

23. Although initially Netflix did not turn a profit, it continued to expand its subscriber base, and in 2003, it posted its first annual profit of roughly $6.5 million on revenues of $272 million. Despite Netflix's subscriber growth, the nature of in-home entertainment was changing.

24. While Netflix was focusing on its mail-based DVD rental business, other companies were working on technologies that would make network communications faster, more reliable, more secure, and more stable. Broadcom and its predecessors and subsidiaries were among those companies focusing on significantly improving network communications. Through these advancements in networking, the types of data that could be effectively communicated over the internet changed drastically. While in the mid-1990s, text and low-resolution still images were standard fare for internet sites, by the mid-2000s, networking improvements allowed for increased speed and efficiency in the transmission of video content, which in turn gave rise to popular sites like YouTube.

25. In 2007, Netflix began to take advantage of the networking achievements of others by introducing a video-on-demand service in addition to its mail-based DVD rental business. Due to advancements in the infrastructure that supported networked video distribution

over the internet, Netflix's on-demand content-delivery service became increasingly popular, allowing Netflix to eventually discontinue its mail-based rental service.

26. Technology companies such as CA, Avago, and their affiliates have continued to make improvements to keep pace with the increased demand for content. Innovations in infrastructure equipment, coding and transmission protocols, processing techniques, and storage configurations have all been important in developing the ability to support ever-increasing demands for fast-and-efficient video streaming.

27. Netflix has been the beneficiary of these improvements by Plaintiffs and others. It has been able to deploy a worldwide content-delivery network, based in part on Plaintiffs' patented technology. Netflix relies on this technology for crucial parts of its streaming service. For example, Netflix's streaming service has implemented advanced storage, caching, processing, and computing techniques to minimize delay, latency, and lag in delivering popular content to its subscribers. In addition, Netflix's streaming service has implemented Plaintiffs' innovative techniques for tailoring configuration information for its individual subscribers.

28. In doing so, without authorization or license to these and other inventions of Plaintiffs, Netflix has caused, and continues to cause, substantial and irreparable harm to Plaintiffs. As an example, Broadcom, through its subsidiaries, sells semiconductor chips used in the set-top boxes that enable traditional cable-television services. Upon information and belief, as a direct result of the on-demand streaming services provided by Netflix, the market for traditional cable services that require set-top boxes has declined, and continues to decline, thereby substantially damaging the set-top-box business of Broadcom and its subsidiaries.

29. Upon information and belief, Netflix could not displace traditional cable-television services, or could not do so as effectively, without the use of Plaintiffs' patented

technology that enables critical aspects of Netflix's systems. Netflix's infringement relates directly to its activities in Texas and in this District, where Netflix has chosen to deploy its content-delivery network.

COUNT I — INFRINGEMENT OF U.S. PATENT NO. 7,103,794

30. Plaintiffs reallege and incorporate by reference the allegations in paragraphs 1 through 29 above as if set forth fully herein.

31. The '794 Patent, which is entitled "Network Object Cache Engine," was duly issued by the United States Patent & Trademark Office on September 5, 2006, from a patent application filed on June 8, 1998. The '794 Patent names Michael Malcolm and Robert Zarnke as inventors. A copy of the '794 Patent is attached to this Complaint as Exhibit A.

32. The '794 Patent is assigned to CA, which currently owns all substantial rights, title, and interest in and to the '794 Patent.

33. The '794 Patent is directed to an improvement in the speed and efficiency of delivering content over a computer network. Specifically, the patent discloses a new approach of delivering content over a computer network, using a cache engine, cache memory, and mass storage as part of a method for caching network objects. Maintaining certain network objects in cache memory, as opposed to mass storage, allows the network to more quickly and efficiently retrieve and deliver those objects to users or client devices requesting the objects.

34. The '794 Patent addresses a specific technical problem that existed in prior networks, namely congestion in a network from "transmitting the same or similar information multiple times, which can tax the communication structure of the network and the resources of the server, and cause clients to suffer from relatively long response times." '794 Patent, at 1:9–18. The patent notes that the problem "is especially acute in several situations: (a) where a

particular server is, or suddenly becomes, relatively popular; (b) where the information from a particular server is routinely distributed to a relatively large number of clients; (c) where the information from the particular server is relatively time-critical; and (d) where the communication path between the server and its clients, or between the clients and the network, is relatively slow." *Id.* at 1:18–26.

35. The inventors of the '794 Patent observed that in the prior art, one method that tried to alleviate the congestion problem was to employ a processor to act "as a proxy, receiving requests for information from one or more clients, obtaining that information from one or more servers, and transmitting that information to the clients in place of the servers." *Id.* at 1:27–32. The inventors observed that although this proxy technique could reduce traffic in the network, "it has the drawback that significant overhead is required by the local operating system and the local file system or file server of the proxy[, which] adds to the expense of operating the network and slows down the communication path between the server and the client." *Id.* at 35–41.

36. Thus, a need still existed for a solution to overcome the network-congestion problem that was not subject to additional delay or restricted functionality from the prior proxy techniques.

37. The '794 Patent claims specific, novel ways to solve these technical problems by employing a cache engine coupled to the network to provide a cache of transmitted objects. The claims of the '794 Patent are directed to new, improved methods and apparatuses for employing a cache engine in a network environment.

38. The methods and apparatuses described in the '794 Patent improve the functionality of a networked computer system by reducing the time required to retrieve and deliver content through the network.

39. Claim 1 of the ’794 Patent states:

1. A method, including steps of:

receiving a set of network objects in response to a first request to a server from a client; and

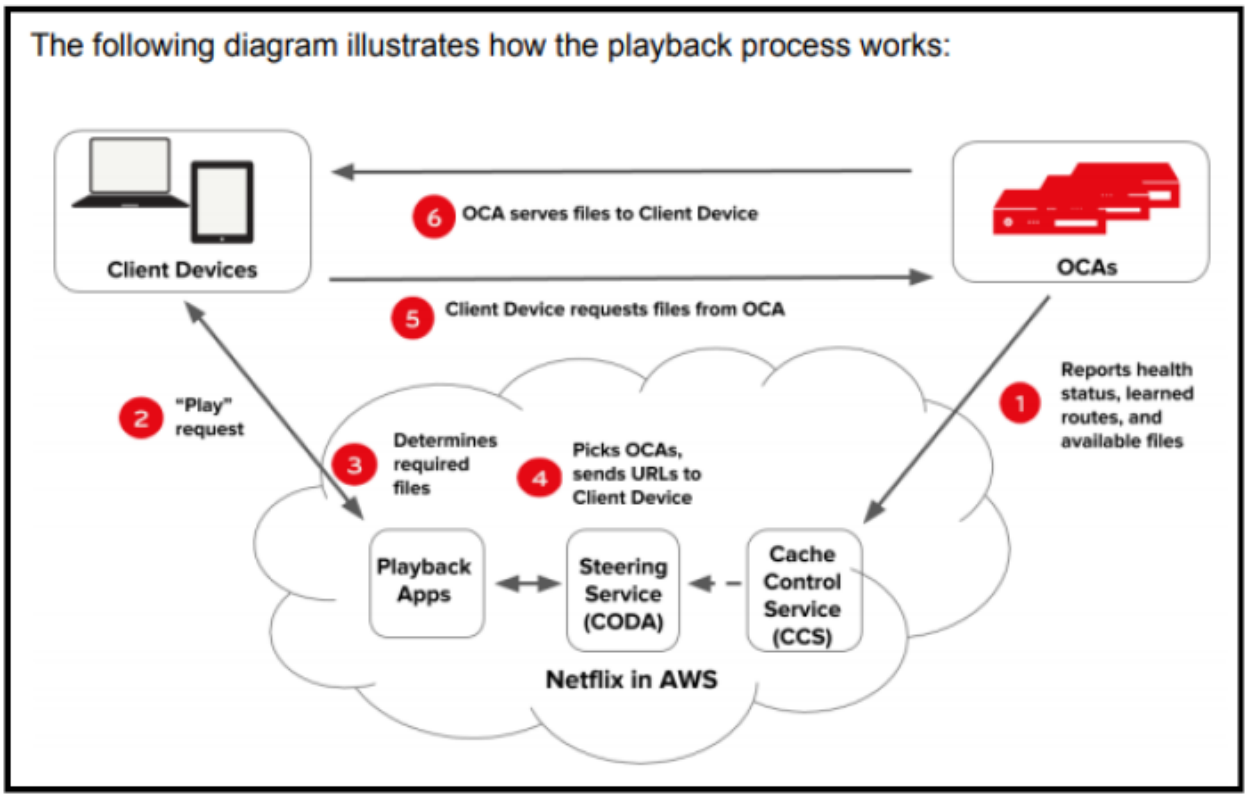
maintaining said network objects in a cache memory in a cache engine, said cache engine connected via a network to the server and the client, said cache memory including mass storage;

wherein said step of maintaining includes steps of recording said network objects in said cache memory and retrieving said network objects from said cache memory, so as to substantially minimizes a time required for retrieving said network objects from said mass storage.

40. Netflix directly infringes the ’794 Patent by making, using, offering to sell, and/or selling in the United States its Netflix service, which utilizes the inventions claimed in the ’794 Patent to reduce congestion in and to improve speed and efficiency of Netflix’s system, including its content delivery network (“CDN”). Netflix directly infringes at least independent claim 1 of the ’794 Patent as discussed below.

41. As discussed above, when Netflix moved away from its mail-based DVD rental business, it began developing a large-scale network for delivering video on demand to its subscribers. The backbone of Netflix’s CDN is its OCAs, which Netflix has now deployed throughout the world, including sites within the Eastern District of Texas. Netflix’s OCAs are integral to its infringement of the ’794 Patent. The diagram[12] below illustrates how Netflix’s OCAs fit within Netflix’s CDN:

[12] https://openconnect.netflix.com/Open-Connect-Overview.pdf.



42. Netflix touts its caching techniques, including the techniques that infringe the '794 Patent. Specifically, Netflix implements a process of "proactive caching," which deploys updates during configured fill windows. Netflix explains: "Because we can predict with high accuracy what our members will watch and what time of day they will watch it, we can make use of non-peak bandwidth to download most of the content updates to the OCAs in our network during these configurable time windows. By reducing disk reads (content serving) while we are performing disk writes (adding new content to the OCAs), we are able to optimize our disk efficiency by avoiding read/write contention."[13]

43. Through its proactive-caching process, Netflix deploys network objects such as video content to the OCAs, where the content can be retrieved quickly for delivery in a rapid and

[13] Netflix and Fill, The Netflix Tech Blog, https://netflixtechblog.com/netflix-and-fill-c43a32b490c0.

efficient manner. Netflix explains: "Now that Netflix operates in 190 countries and we have thousands of appliances embedded within many ISP networks around the world, we are even more obsessed with making sure that our OCAs get the latest content as quickly as possible while continuing to minimize bandwidth cost to our ISP partners."[14]

44. One of Netflix's primary goals in deploying its CDN is to serve content over the shortest networking path to maximize the streaming experience by reducing network latency. At the same time, however, Netflix acknowledges that it cannot store at the OCAs all of the content Netflix has available on its system. Thus, Netflix has implemented a system for including only the most popular content in cache at the local OCAs: "Given the finite amount of disk space available per server and the large size of the entire Netflix catalog, we cannot fit all content in every cluster of co-located servers. Many clusters that are proximally located to end-users (ISP clusters) do not have enough disk capacity to fit the entire Netflix catalog. Therefore, we cache only the most popular content on these clusters."[15]

45. Anyone who has used Netflix's streaming service knows how it works at an extremely high level — the Netflix application allows subscribers to choose from thousands of video titles, and the application quickly begins streaming the selected content to the subscriber's device (TV, tablet, smartphone, etc.) via the internet. But invisible to the user are countless systems-and-network operations employed by Netflix's CDN to deliver that content in the most efficient and seamless way possible, including by implementing the inventions of the '794 Patent.

[14] *Id.*

[15] Content Popularity for Open Connect, The Netflix Tech Blog, https://netflixtechblog.com/content-popularity-for-open-connect-b86d56f613b.

46. The Netflix video content delivered to a Netflix application, commonly called a "client" in networking terms, is a "set of network objects." These network objects may be received by various nodes in the Netflix CDN. For example, at a minimum, the network objects are received by the client from a Netflix OCA. The client receives these network objects in response to a request to a server, such as from an OCA in the Netflix CDN.

47. Invisible to the end user, the servers in the Netflix CDN, such as OCAs, maintain the network objects in cache memory. As deployed by Netflix, the cache memory includes mass storage, for example storage with Netflix's backend services and/or the OCAs.

48. As part of its process to maintain the network objects in cache memory, the Netflix system records the network objects, for example its video content, in cache memory at the OCAs. As discussed, Netflix organizes its content to "optimize [its] CDN" by "[m]inimizing network distance." Netflix explains: "the Open Connect global CDN consists of servers that are either physically located in ISP data centers (ISP servers) or IXP data centers (IX servers). We aim to serve as much of the content as possible over the shortest networking path. This maximizes the streaming experience for our members by reducing network latencies."[16]

49. In locating popular content in cache memory located close to its subscribers, Netflix enhances the streaming experience. Netflix has servers all over the world and sends the video stream from its servers that are as close to the subscriber as possible. The shorter the route, the higher the video quality. Netflix acknowledges it caches the most popular content rather than retrieving that content from mass storage when a subscriber requests such content.[17] If the

[16] Content Popularity for Open Connect, The Netflix Tech Blog, https://netflixtechblog.com/content-popularity-for-open-connect-b86d56f613b.

[17] *Id.*

distribution network has slowdowns or capacity problems, a subscriber's Netflix experience will suffer.

50. By doing this, the Netflix CDN substantially minimizes a time required for retrieving the network items from mass storage. Netflix states: "[W]e are even more obsessed with making sure that our OCAs get the latest content as quickly as possible while continuing to minimize bandwidth cost to our ISP partners."[18] "Popular files are locked into memory rather than fetched constantly from disk. This latter memory optimization eliminates the possibility of disk I/O being the cause of a server capacity bottleneck."[19]

51. Through the operation of its CDN, Netflix has infringed and continues to infringe at least Claim 1 of the '794 Patent. That infringement has caused and continues to cause damage to CA, and CA is entitled to recover damages sustained as a result of Netflix's wrongful acts in an amount subject to proof at trial.

COUNT II — INFRINGEMENT OF U.S. PATENT NO. 8,656,419

52. Plaintiffs reallege and incorporate by reference the allegations in paragraphs 1 through 51 above as if set forth fully herein.

53. The '419 Patent, which is entitled "Dynamic Distributed Evaluator," was duly issued by the United States Patent & Trademark Office on February 18, 2014, from a patent application filed on July 2, 2009. The '419 Patent names Raymond R. Medeiros, II, Robert E. Hucik, Beau Croteau, and Gregory L. Bodine as inventors. A copy of the '419 Patent is attached to this Complaint as Exhibit B.

[18] Netflix and Fill, The Netflix Tech Blog, https://netflixtechblog.com/netflix-and-fill-c43a32b490c0.

[19] Content Popularity for Open Connect, The Netflix Tech Blog, https://netflixtechblog.com/content-popularity-for-open-connect-b86d56f613b.

54. The ’419 Patent is assigned to CA, which currently owns all substantial rights, title, and interest in and to the ’419 Patent.

55. The ’419 Patent is directed to an improvement in the efficiency of computing in general and distributed computing in particular. Specifically, the ’419 Patent discloses a new method of performing distributed computing where a first node in the network instructs other nodes to perform certain functions, instructs those nodes how to perform those functions, and instructs those nodes what to do with the results. In exemplary embodiments, the first node does not direct any particular node to carry out these steps, nor is the first node even aware of which node will perform the steps. Thus, by decoupling nodes that needed tasks performed from the nodes that would perform the task, the inventors foresaw that “different nodes 20 may use different operating systems, such as UNIX, LINUX, or WINDOWS, and/or one or more different programming languages, such as JAVA or C.” ’419 Patent, at 2:23–24. Not only could work be performed by different nodes, but “[i]n some embodiments, an application may be distributed such that multiple nodes 20 perform the operations.” *Id.* at 2:34–35.

56. In these exemplary embodiments, because the first node is not aware of which node will perform the steps and likewise does not direct any specific node to perform the steps, the network operates more efficiently by dynamically distributing the performance of the steps to nodes that have the resources to perform the steps.

57. Through its claims, the ’419 Patent addresses a specific technical problem that existed in prior computing platforms, namely inflexible networks of computing resources that could not be easily scaled or reconfigured, including for example situations where certain computing resources became overloaded but were not designed to be able shift work to others.

Situations like this example lead to slowed processing times, which in turn, can result in delays in data transmission through the network.

58. The methods and apparatuses described in the '419 Patent improve the functionality of a networked computer system by implementing distributed-computing embodiments that solve the congestion and overloading problems of prior systems.

59. Claim 1 of the '419 Patent states:

> 1. An apparatus, comprising a first node of a network, the first node comprising:
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> an interface operable to:
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> communicate with a second node of the network; and
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> one or more processors operable to:
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> tell a plurality of nodes to perform an operation comprising a procedure of an application, the plurality of nodes comprising a second node and one or more additional nodes;
>
> instruct the plurality of nodes how to perform the operation using computer code; and
>
> tell the plurality of nodes what to do with a result of the operation, and
>
> wherein the one or more processors does not know which one of the plurality of nodes will perform the operation.

60. Netflix directly infringes the '794 Patent by making, using, offering to sell, and/or selling in the United States its Netflix network and service, which utilize Netflix's Titus Container Management Platform to deploy and manage virtual computing resources.

61. Netflix's Titus is a container-management platform that Netflix claims "provides scalable and reliable container execution and cloud-native integration with Amazon AWS."[20] According to Netflix, "Titus was built internally at Netflix and is used in production to power

[20] https://netflix.github.io/titus/overview/.

Netflix streaming, recommendation, and content systems."[21] The development work for Titus began in 2015, long after the invention of the '419 Patent.

62. Using the technology of the '419 Patent, Titus enables Netflix to support a wide variety of use cases. Netflix explains: "Batch users develop code locally and then immediately schedule it for scaled execution on Titus. Using containers, Titus runs any batch application letting the user specify exactly what application code and dependencies are needed. For example, in machine learning training we have users running a mix of Python, R, Java and bash script applications."[22]

63. Netflix continued to realize the benefits offered by the '419 Patent. "[T]itus evolved initially from supporting batch use cases, to running services applications (both internal, and ultimately critical customer-facing). Through that evolution, container use at Netflix has grown from thousands of containers launched per week to as many as three million containers launched per week in April 2018. Titus hosts thousands of applications globally over seven regionally isolated stacks across tens of thousands of EC2 virtual machines."[23]

64. As discussed, Netflix's streaming service is deployed through a network of connected devices and services. The backend of Netflix's service is hosted on AWS and contains numerous networked nodes. A first node in Netflix's network is, for example, the "Titus Gateway" or "Titus API." Netflix describes the Titus Gateway as "a scalable API tier that

[21] *Id.*

[22] https://netflixtechblog.com/the-evolution-of-container-usage-at-netflix-3abfc096781b.

[23] https://netflixtechblog.com/titus-the-netflix-container-management-platform-is-now-open-source-f868c9fb5436

handles direct requests from clients and users. The Gateway exposes gRPC and REST APIs, handles connection management, and performs validation."[24]

65. In addition to the first node, e.g. the Titus Gateway, the Netflix network contains a plurality of other nodes. Examples of these other nodes include Titus Agents, which "are responsible for setting up and running task containers and managing their lifecycle. The Agent sets up on host resources, such as storage and networking resources, and launches the container using Docker. The Agent monitors the task, reporting status and cleaning up resources when it completes."[25] In this example, one of the Titus Agents can be referred to as a "second node" in the context of Claim 1 of the '419 Patent.

66. The first node also includes an interface that is operable to communicate with the second node of the network. For example, Netflix's Titus Gateway is capable of communicating jobs to Titus Agents via a Titus Master interface. Netflix describes the functionality of the Titus Master: "The Master receives requests from Gateway instances and creates and persists job and task info in response. The Master schedules tasks onto Agents with available resources and scales the pool of Titus Agents up or down in response to demand."[26]

67. The first node also comprises one or more processors per Claim 1 of the '419 Patent. Netflix explains the integration of its network within the AWS EC2 cloud: "We deploy Titus via Spinnaker to an EC2 cloud provider."[27] Each EC2 instance includes one or more processors, for example AWS Graviton2 processors or Xeon E5 Broadwell processors.

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[24] Overview, Titus, https://netflix.github.io/titus/overview/.

[25] *Id.*

[26] *Id.*

[27] Required, Titus, https://netflix.github.io/titus/install/prereqs/.

68. In the Netflix network, the one or more processors are operable to "tell a plurality of nodes to perform an operation comprising a procedure of an application." Netflix's description of Titus explains that "[w]ork in Titus is described by a job specification that details what to run (e.g., a container image and entry point)." By example, the Titus Gateway "exposes gRPC and REST APIs, handles connection management, and performs validation."[28] Of course, the Titus Gateway performs these functions using its one or more processors, as indicated by portions of source code that are publicly available.[29]

69. In the Netflix network, the plurality of nodes includes the second node and one or more additional nodes. For example, in the Netflix network, the Titus Agents set up and manage virtual-machine containers that are able to independently carry out discrete computing tasks to ensure reliable and efficient delivery of Netflix's streaming services.[30]

70. The one or more processors in Titus also instruct the plurality of nodes how to perform the operation using computer code. Netflix explains this as well: "Work in Titus is described by a job specification that details . . . metadata (e.g., the job's purpose and who owns it), and what resources are required to run it, such as CPU, memory, or scheduling constraints (e.g., availability zone balancing or host affinity)."[31] As another example, Netflix states: "Titus can run images packaged as Docker containers while providing additional security and reliability around container execution."[32] A Docker image is a file, comprised of multiple layers, that is used to execute code in a container.

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[28] Overview, Titus, https://netflix.github.io/titus/overview/.

[29] *See, e.g.*, https://github.com/angelbarrera92/titus-terraform/.

[30] https://netflix.github.io/titus.

[31] Overview, Titus, https://netflix.github.io/titus/overview/.

[32] https://netflix.github.io/titus/; *see also* Docker Overview, Docker Docs, https://docs.docker.com/get-started/overview/.

71. On information and belief, in the Netflix network, the one or more processors tell the plurality of nodes what to do with a result of the operation. By way of example, Titus jobs can specify a "logLocation" where a container's output can be directed.[33]

72. Finally, in the Netflix network, the one or more processors does not know which one of the plurality of nodes will perform the operation. One asserted benefit of Titus is "heterogeneous capacity management," which corresponds to this element of the '419 Patent: "One of the benefits of using containers through Titus is that it abstracts much of the machine-centric management that applications were doing in VMs. In many cases, users can tell Titus to 'run this application' without worrying about where or on which instance type the container runs. Users still want some guarantees, however, around if or when their applications will run. These guarantees are particularly important when running applications with differing objectives and priorities. For example, a microservice would want to know it was capable of scaling its number of containers in response to increased traffic, even though a batch job may be consuming significant resources by launching thousands of tasks on the same cluster."[34]

73. Through the implementation and operation of its network, Netflix has infringed and continues to infringe at least Claim 1 of the '419 Patent. That infringement has caused and continues to cause damage to CA, and CA is entitled to recover damages sustained as a result of Netflix's wrongful acts in an amount subject to proof at trial.

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[33] *See, e.g.*, https://spinnaker.io/guides/operator/custom-job-stages/#custom-job-stages---titus.

[34] Andrew Leung et al., Titus: Introducing Containers to the Netflix Cloud, 15 ACMQUEUE 5, https://queue.acm.org/detail.cfm?id=3158370; *see also* The Evolution of Container Usage at Netflix, The Netflix Technology Blog, https://netflixtechblog.com/the-evolution-of-container-usage-at-netflix-3abfc096781b.

COUNT III — INFRINGEMENT OF U.S. PATENT NO. 8,646,014

74. Plaintiffs reallege and incorporate by reference the allegations in paragraphs 1 through 73 above as if set forth fully herein.

75. The ’014 Patent, which is entitled “Multistream Video Communication With Staggered Access Points,” was duly issued by the United States Patent & Trademark Office on February 4, 2014, from a patent application filed on May 24, 2013, which claims priority through a series of applications to March 26, 2004. The ’014 Patent names Alexander MacInnis as inventor. A copy of the ’014 Patent is attached to this Complaint as Exhibit C.

76. The ’014 Patent is assigned to Avago, which currently owns all substantial rights, title, and interest in and to the ’014 Patent.

77. The ’014 Patent addresses a specific technical problem that existed in prior video receiving systems, namely “a latency time between when the user requests video information and when the system presents the requested video information to the user.” ’014 Patent, at 1:46–48. The inventor of the ’014 Patent observed: “There may be any of a large variety of causes for such latency. Such causes may comprise, without limitation, request processing delays, information communication delays and information processing delays. In general, users prefer that the latency time between a video information request and presentation of the requested video information to the user be minimized.” *Id.* at 1:48–54.

78. The ’014 Patent claims specific, novel ways to solve these technical problems by receiving a plurality of video information streams and identifying which of the video streams will result in a lower latency in presenting the unit of video information. For example, the patent discloses “in various exemplary scenarios, the plurality of video information streams may represent the same unit of video information. For example and without limitation, a first video

information stream may correspond to expected lower video presentation latency, while a second video information stream may correspond to a higher video quality." *Id.* at 17:34–40. The claims of the '014 Patent are directed to new, improved methods, systems, and non-transitory computer readable mediums for receiving video information.

79. The methods, systems, and computer readable medium described in the '014 Patent improve the functionality of a networked computer system by reducing latency in a video signal processing system.

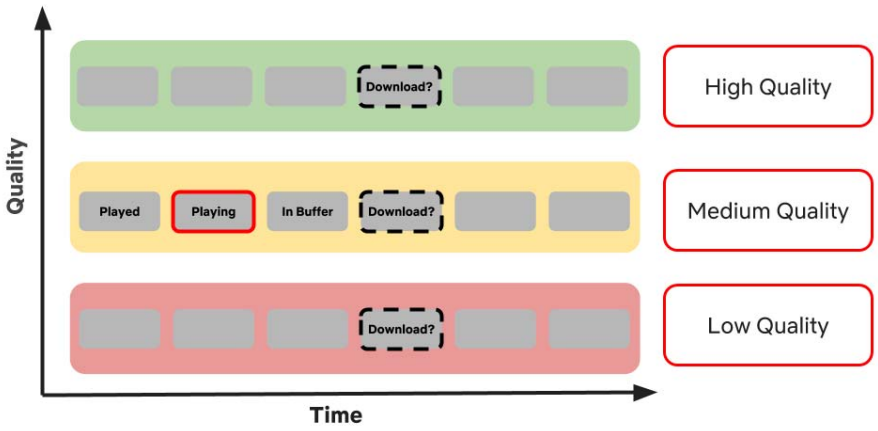
80. Claim 1 of the '014 Patent states:

> 1. A method in a video receiving system for receiving video information, the method comprising:
>
> receiving, by a receiver, a request by a user for a unit of video information;
>
> receiving, by the receiver, a plurality of video information streams, each of which represents the requested unit of video information;
>
> identifying, by the receiver, which of the plurality of video information streams, when processed, is expected to result in a lower latency in presenting the unit of video information; and
>
> processing, by the receiver, the identified video information stream to present the unit of video information.

81. Netflix directly infringes the '014 Patent by making, using, offering to sell, and/or selling in the United States its Netflix service, which utilizes the inventions claimed in the '014 Patent to provide reduced latency in a video signal processing system, including for its Netflix applications and in its content delivery network ("CDN"). Netflix directly infringes at least independent claim 1 of the '014 Patent as discussed below.

82. Subscribers access the Netflix service using the Netflix application, which Netflix makes and distributes on a wide variety of devices. The Netflix application interfaces with the Netflix CDN to provide Netflix subscribers with a video receiving system for receiving video

information from Netflix. The Netflix application allows subscribers to choose from thousands of video titles in Netflix's catalog. When a subscriber selects a particular title via the Netflix application's user interface, components within the application receive the user's request for the selected title. Then, as previously described, the Netflix Application attempts to retrieve the selected title via Netflix's content delivery network. Using the patented technology of the '014 patent, Netflix is able to "deliver the best video quality stream to a member, no matter what the program or genre, tailored to the member's available bandwidth and viewing device capability."[35]



83. As illustrated above, a Netflix title is encoded at different qualities.[36] Netflix "pre-encode[s] streams at various bitrates applying optimized encoding recipes."[37] Each quality version of the video is divided up into chunks of a fixed duration (grey boxes). The Netflix

[35] Per-Title Encode Optimization, Netflix Technology Blog (Dec. 14, 2015), https://netflixtechblog.com/per-title-encode-optimization-7e99442b62a2 [*hereinafter* Per-Title Encoding Article].

[36] Using Machine Learning to Improve Streaming Quality at Netflix, Netflix Tech. Blog, https://netflixtechblog.com/using-machine-learning-to-improve-streaming-quality-at-netflix-9651263ef09f [*hereinafter* Machine Learning Article].

[37] *See* Per-Title Encoding Article, *supra*.

application receives these video information streams, each of which represents the requested title.

84. The Netflix application decides which quality to choose for each chunk that is downloaded.[38] As Netflix explains on its technology blog, "On the member's device, the Netflix client runs adaptive streaming algorithms which instantaneously select the best encode to maximize video quality while avoiding playback interruptions due to rebuffers."[39] Thus, the Netflix application identifies which of the plurality of video information streams, when processed, is expected to result in a lower latency in presenting the requested title. The Netflix application then processes the identified video stream in order to present the requested title to the user.

85. Through the particular programming of the Netflix application and the Netflix CDN described in the preceding paragraphs, Netflix directs and controls the relevant actions of its subscribers. For example, Netflix controls the operation of the Netflix application (including its adaptive streaming algorithm), forbids users to alter its programming,[40] and takes measures to ensure that Netflix content is only accessible to paying subscribers via the Netflix application. Thus, Netflix conditions the adaptive streaming of its video content upon performance of the steps of the '014 Patent and establishes the manner or timing of that performance. Since Netflix is in control of the operation of the Netflix application and the Netflix CDN, Netflix has the right

[38] *See* Machine Learning Article, *supra*.

[39] *See* Per-Title Encoding Article, *supra*.

[40] For example, Netflix subscribers agree not "to decompile, reverse engineer or disassemble any software or other products or processes accessible through the Netflix service; insert any code or product or manipulate the content of the Netflix service in any way." See https://help.netflix.com/legal/termsofuse.

and ability to stop or limit infringement of the ’014 patent, and thus infringes vicariously by profiting from the direct infringement.

86. Through the operation of its adaptive streaming technology, Netflix has infringed and continues to infringe at least Claim 1 of the ’014 Patent. That infringement has caused and continues to cause damage to Avago, and Avago is entitled to recover damages sustained as a result of Netflix’s wrongful acts in an amount subject to proof at trial.

COUNT IV — INFRINGEMENT OF U.S. PATENT NO. 9,402,098

87. Plaintiffs reallege and incorporate by reference the allegations in paragraphs 1 through 86 above as if set forth fully herein.

88. The ’098 Patent, which is entitled “Fast Channel Change,” was duly issued by the United States Patent & Trademark Office on July 26, 2016, from a patent application filed on February 25, 2014. The ’098 Patent claims priority to Application No. 10/926,374, filed on August 25, 2004, and to Provisional Application No. 60/556,667, filed on March 26, 2004. The ’098 Patent names Alexander Garland MacInnis as the inventor. A copy of the ’098 Patent is attached to this Complaint as Exhibit D.

89. The ’098 Patent is assigned to Avago, which currently owns all substantial rights, title, and interest in and to the ’098 Patent.

90. The ’098 Patent is directed to an improvement for video-signal-processing systems and video-delivery systems through the reduction of latency time between when a user requests video information and when the system presents the requested video information to the user. Because latency is generally undesirable in a video system, the inventor developed a specific process for reducing latency by varying the transmission rate for the video within the system. Notably, the ’098 Patent describes embodiments where following a request for video

content from a remote video receiver, a video transmitter sends video content at an initial rate for a first period of time where that initial rate is greater than a steady-state transmission rate followed by transmitting a second portion of the video content for a second time period at the steady-state transmission rate.

91. The ’098 Patent address a specific technical problem that existed in prior networks, namely excessive latency between a request for video content and the delivery of such content. In addressing this latency problem, the inventor of the ’098 Patent recognized that “[t]here may be any of a large variety of causes for such latency[, including] request processing delays, information communication delays and information processing delays.” ’098 Patent, at 1:25–31.

92. The ’098 Patent claims specific, novel ways to solve the technical problem of unacceptable latency, regardless of the cause of such latency, by implementing varying-rate transmission that begins the transmission at a high rate and then reduces that rate to a steady-state rate, while adjusting the rate as the available bandwidth in the network changes, such that the rate returns to the steady-state rate when the system has sufficient available bandwidth.

93. The methods and apparatuses described in the ’098 Patent improve the functionality of video-transmission systems and network, including by reducing the latency associated with prior systems and networks.

94. Claim 1 of the ’098 Patent states:

> 1. A method, comprising:
>
> receiving, by a video transmission system having one or more processors, a request for a unit of video information from a remote video receiver;
>
> determining an initial transmission rate for the unit of video information using a real-time determination of available communication bandwidth between the video transmission system and the remote video receiver and a first

steady-state transmission rate for the unit of video information, the initial transmission rate being higher than the first steady-state transmission rate;

for a first time period after receiving the request, transmitting, by the video transmission system, a first portion of the unit of video information to the remote video receiver at the initial transmission rate, wherein in response to a change in the available communication bandwidth between the video transmission system and the remote video receiver during the first time period, transmitting a remainder of the first portion of the unit of video information to the remote video receiver at a second transmission rate for a remainder of the first time period, the second transmission rate being determined using the change in the available communication bandwidth and being different from the initial transmission rate and the first steady-state transmission rate; and

for a second time period after the first time period, receiving a second portion of the unit of video information from the remote video transmitter at the first steady-state transmission rate.

95. Netflix directly infringes the ’098 Patent by making, using, offering to sell, and/or selling in the United States its Netflix service, which utilizes the inventions claimed in the ’098 Patent to decrease latency in and to improve the efficacy of Netflix’s video-streaming service, including improvements to its CDN and Netflix applications running on subscriber devices. Netflix directly infringes at least independent claim 1 of the ’098 Patent as discussed below.

96. Netflix has implemented in its CDN and Netflix applications specific technologies to improve the streaming experience of its subscribers, including implementing the patented methods of the ’098 Patent. As discussed above, Netflix’s CDN contains thousands of servers known as OCAs, which interface with other parts of the CDN, including the Netflix application on a subscriber’s device and backend processes running on AWS.

97. Netflix has explained that one of its primary goals in deploying its CDN is to maximize the streaming experience by reducing latency time between a video information request and presentation of the requested video information to the user—the specific problem the

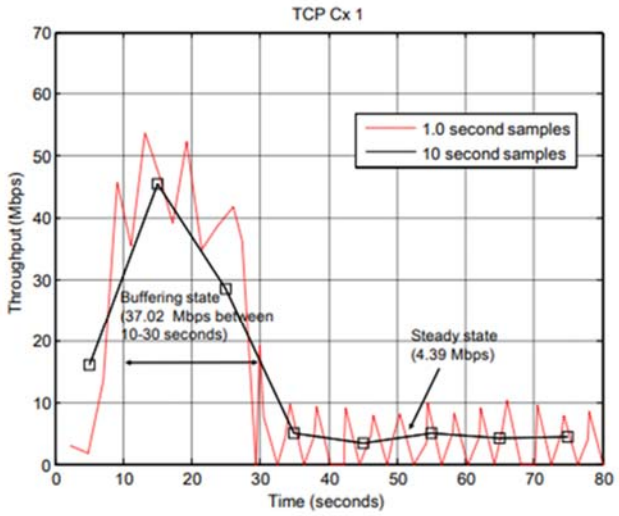
'098 Patent solves.[41] One way it reduces latency is by locating its OCAs near its subscribers, such as by deploying them at ISP locations around the world, including in the Eastern District of Texas, where on information and belief, Netflix has a substantial number of subscribers. Another way Netflix reduces latency in its video-transmission system is by using the patented techniques described and claimed in the '098 Patent.

98. Indeed, Netflix implements the steps of at least Claim 1 of the '098 Patent through the adaptive streaming technologies in its CDN and Netflix applications. Its OCAs form part of a video-transmission system having one or more processors. On information and belief, Netflix's OCAs are complex servers that have onboard processors that implement and control portions of Netflix's video-transmission system.

99. In operation of the Netflix system, an OCA receives a request for a unit of video, such as a movie or television show, from a remote video receiver, typically the Netflix application operating on a subscriber's device, such as a TV, tablet, smartphone, etc., via the internet. The Netflix system determines both "an initial transmission rate for the unit of video information" and "a first steady-state transmission rate for the unit of video information," where the initial transmission rate is higher than the first steady-state transmission rate. Indeed, third-party analyses[42] illustrate these two rates:

[41] Content Popularity for Open Connect, The Netflix Tech Blog, https://netflixtechblog.com/content-popularity-for-open-connect-b86d56f613b.

[42] Martin et al., Characterizing Netflix Bandwidth Consumption, https://people.cs.clemson.edu/~jmarty/papers/CCNC2013FINALSUBMISSION.pdf.



(b) DASH client behavior

Fig. 1. Dash system components and client behavior

100. The researchers explained their findings:

> While in a buffering state, the client requests data at a rate up to the available bandwidth over the path between the server and the client. If conditions permit, the session will attempt to find a 'steady state' where it requests segments at a rate necessary to playback the content at a given encoded bitrate. . . .
>
> Figure 1b illustrates the observed behavior of a Netflix client operating on a Windows desktop located at our campus. The results illustrate the evolution of the first 80 seconds of the single TCP connection involved with the Netflix session over an uncongested high speed network (i.e., the available bandwidth significantly exceeds the requirements of a Netflix session). The results capture the downstream throughput (i.e., the rate at which Netflix video data is forwarded to the client device). The solid curve formed by the square data points is based on 10 second throughput sampling intervals and the lighter dashed curve is based on 1 second samples. The figure shows the initial buffering state and, once the playback buffer is full, that the session moves into a steady state within about 35 seconds.[43]

101. To determine the initial rate, on information and belief, the Netflix CDN uses a real-time determination of available communication bandwidth between the video transmission

[43] *Id.; see also* Network Level Characterization of Adaptive Streaming over HTTP Applications, available at https://www.researchgate.net/publication/280154796_Network_level_characterization_of_adaptive_streaming_over_HTTP_applications/link/572a3c7708ae057b0a078d29/download.

system, for example an OCA, and the remote video receiver, such as the Netflix application on a subscriber device. For one exemplary technique, Netflix explains: "At Netflix we stream to a heterogenous set of viewing devices. This requires a number of codec profiles: VC1, H.264/AVC Baseline, H.264/AVC Main and HEVC. We also support varying bandwidth scenarios for our members, all the way from sub-0.5 Mbps cellular to 100+ Mbps high-speed Internet. To deliver the best experience, we generate multiple quality representations at different bitrates (ranging from 100 kbps to 16 Mbps) and the Netflix client adaptively selects the optimal stream given the instantaneous bandwidth."[44]

102. In the exemplary operation of Netflix's CDN, after receiving a request for a unit of video, the video-transmission system, through for example an OCA, transmits a first portion of the unit of video information to the Netflix application on the subscriber device at the initial transmission rate. On information and belief, in Netflix's CDN, as in the '098 Patent, where there is a change in the available communication bandwidth between the video transmission system and the remote video receiver during the first period, the video transmission system transmits the remainder of the first portion of the unit of video information to the remote video receiver at a second transmission rate for a remainder of the first time period. For example, if a network disruption limits the available bandwidth between an OCA and the Netflix application on a subscriber device, the Netflix CDN will adjust the transmission rate for the video stream.

103. On information and belief, the second transmission rate is different from the initial rate and the first steady-state rate. In the example of transmission from a Netflix OCA to a subscriber device, the second transmission rate is determined by the Netflix CDN using the change in the available communication bandwidth. Indeed, as discussed above, Netflix itself has

[44] High Quality Video Encoding at Scale, Netflix Technology Blog (Dec. 9, 2015), available at https://netflixtechblog.com/high-quality-video-encoding-at-scale-d159db052746.

explained that "the Netflix client adaptively selects the optimal stream given the instantaneous bandwidth"[45] and that certain media source extensions "enable our video streaming algorithm's to adapt to your available bandwidth."[46]

104. On information and belief, after the first time period, the Netflix CDN transmits a second portion of the unit of video information to the remote video receiver at the first steady-state transmission rate. For example, independent research has shown that the Netflix CDN establishes a steady-state rate for video transmission after the initial higher-rate transmission, and the CDN will attempt to transmit the remainder of the unit of video information, such as a movie or television show, at that steady-state rate.[47] As discussed above, however, the Netflix CDN transmission rate, in exemplary situations, will differ from the steady-state rate in response to a change in available bandwidth.

105. Through the operation of its CDN, Netflix has infringed and continues to infringe at least Claim 1 of the '098 Patent. That infringement has caused and continues to cause damage to Avago, and Avago is entitled to recover damages sustained as a result of Netflix's wrongful acts in an amount subject to proof at trial.

COUNT V — INFRINGEMENT OF U.S. PATENT NO. 10,911,938

106. Plaintiffs reallege and incorporate by reference the allegations in paragraphs 1 through 105 above as if set forth fully herein.

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[45] High Quality Video Encoding at Scale, Netflix Technology Blog (Dec. 9, 2015), available at https://netflixtechblog.com/high-quality-video-encoding-at-scale-d159db052746.

[46] HTML5 Video is now supported in Firefox, Netflix Technology Blog (Dec. 17, 2015), https://netflixtechblog.com/html5-video-is-now-supported-in-firefox-efcfd5de6c71.

[47] *See, e.g.*, Martin et al., Characterizing Netflix Bandwidth Consumption, https://people.cs.clemson.edu/~jmarty/papers/CCNC2013FINALSUBMISSION.pdf; Network Level Characterization of Adaptive Streaming over HTTP Applications, *available at* https://www.researchgate.net/publication/280154796_Network_level_characterization_of_adaptive_streaming_over_HTTP_applications/link/572a3c7708ae057b0a078d29/download.

107. The ’938 Patent, which is entitled “Method and system for a networked self-configuring communication device utilizing user preference information,” was duly issued by the United States Patent & Trademark Office on February 2, 2021, from a patent application filed on March 30, 2020, which claims through a series of applications a priority date of June 12, 2007. The ’938 Patent names Jeyhan Karaoguz, Arya Behzad, Mark Buer, Alexander G. MacInnis, Thomas Quigley, and John Walley as inventors. A copy of the ’938 Patent is attached to this Complaint as Exhibit E.

108. The ’938 Patent is assigned to Avago, which currently owns all substantial rights, title, and interest in and to the ’938 Patent.

109. The methods and systems described in the ’938 Patent improve the functionality of a networked computer system by reducing latency in a video signal processing system.

110. Claim 1 of the ’938 Patent states:

1. A system comprising:

a plurality of computing devices connected via one or more networks, wherein the system is configured to

receive login information corresponding to a first user;

identify the first user based on the login information;

retrieve user configuration information corresponding to the first user;

control provision of a media content streaming service to a first computing device of the plurality of computing devices based on the user configuration information corresponding to the first user;

update the user configuration information corresponding to the first user based on the provision of the media content streaming service to the first computing device;

receive login information corresponding to the first user from a second computing device of the plurality of computing devices;

identify the first user based on the login information received from the second computing device;

retrieve the updated user configuration information corresponding to the first user; and

control provision of the media content streaming service to the second computing device based on the updated user configuration information corresponding to the first user.

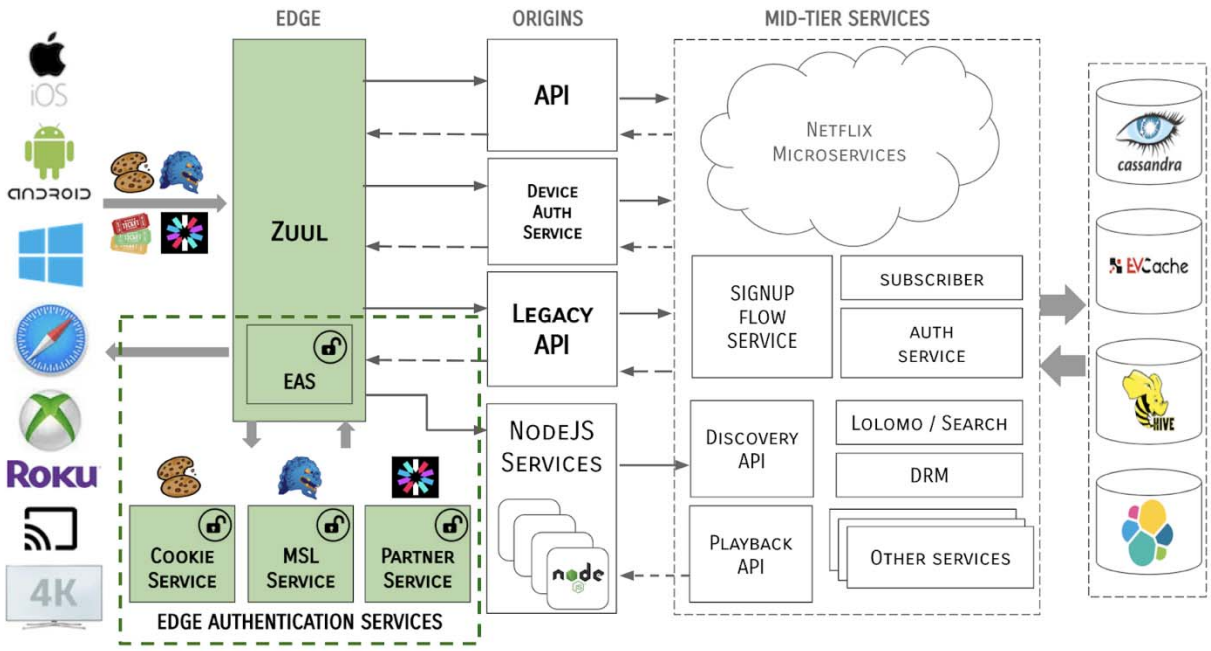
111. Netflix directly infringes the ’938 Patent by making, using, offering to sell, and/or selling in the United States its Netflix service, including its recommendation system and personalized media service, which utilizes the inventions claimed in the ’938 Patent. Netflix directly infringes at least independent claim 1 of the ’938 Patent as discussed below.

112. In the early 2000s, the inventors of the ’938 Patent observed “dramatic growth” in the “field of mobile and/or wireless communication.” ’938 Patent, at 1:65–66. The inventors recognized: “In today’s world, most people use wireless devices for various purposes, including business and personal, on a constant and daily basis. Society is truly becoming a mobile and wireless one. Numerous wireless solutions have been introduced, and have made a tremendous impact on everyday life.” *Id.* at 1:66–2:4.

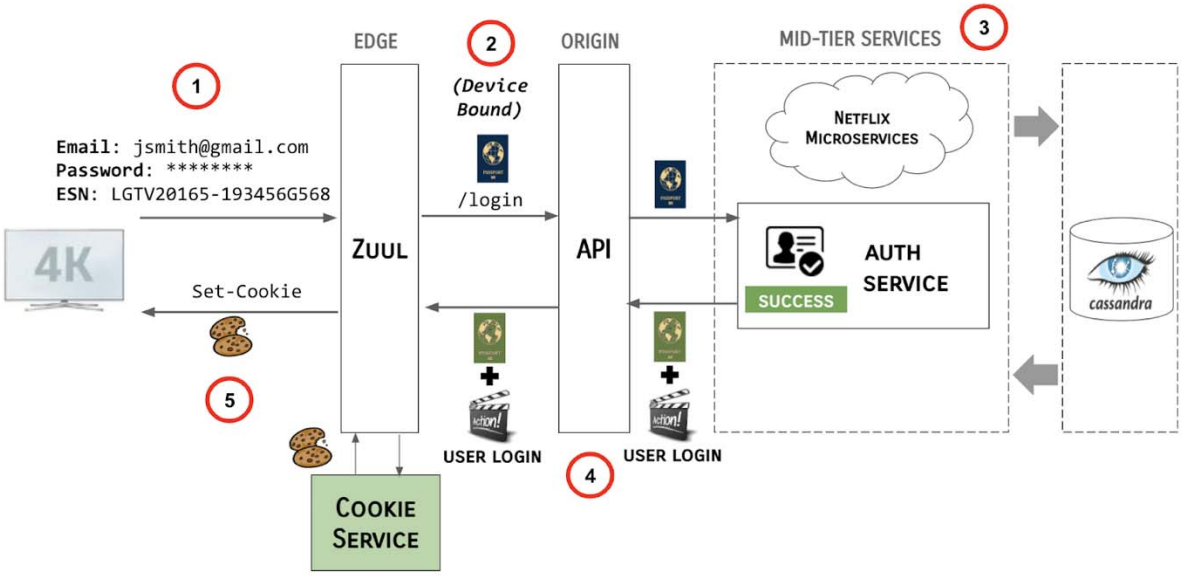
113. Much like the patented technology of the ’938 patent, the Netflix service supports many different categories of devices, including: streaming media players, smart TVs, game consoles, set-top boxes, Blu-ray players, smartphones, tablets, PCs, and laptops.[48]

114. The Netflix service is made up of a multitude of network-connected Netflix services, such as Zuul Edge Authentication Services, Device Authentication Service, and Cassandra, running on computing devices within AWS.

[48] https://devices.netflix.com/en/.



115. To access Netflix's video content, a user must be a paying subscriber of the Netflix service. Netflix subscribers can view Netflix on any of their devices, so long as they are first authenticated by the Netflix service.



116. The figure above illustrates the Netflix login flow.[49] First, a user enters their credentials and the Netflix client transmits the credentials, along with the ESN of the device to the Edge gateway, AKA Zuul. Thus, The Netflix service receives the login information corresponding to the user. Next, identity filters running in Zuul generate a device-bound Passport and pass it along to the API /login endpoint.

117. The API server propagates the Passport to the mid-tier services responsible for authentication the user. Upon successful authentication of the claims provided, these services create a Passport Action and send it, along with the original Passport, back up stream to API and Zuul. Zuul makes a call to the Cookie Service to resolve the Passport and Passport Actions and sends the Cookies back to the Netflix client. Therefore, the Netflix service is able to identify the user based on the login information.

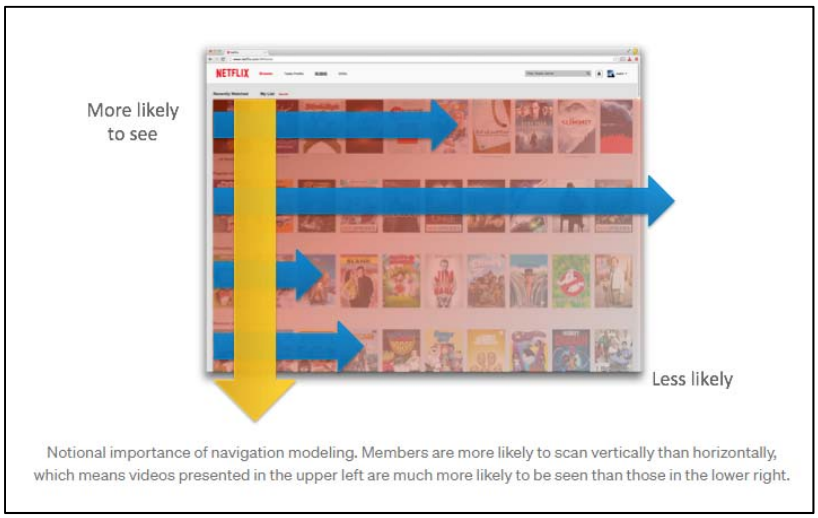
118. Once authenticated, the Netflix service retrieves user configuration information corresponding to the user. Within the Netflix service, the Cassandra service is the primary data store for all persistent data.[50] Netflix tracks information about each user in order to personalize the Netflix experience. Each user profile allows for its own: language preference, maturity level, specific viewing restrictions, profile lock, viewing activity log, subtitle appearance, playback settings, personalized TV show and movie suggestions, my list, ratings, and email.[51]

[49] Netflix Technology Blog (Feb. 9, 2021), https://netflixtechblog.com/edge-authentication-and-token-agnostic-identity-propagation-514e47e0b602.

[50] Netflix's Viewing Data: How We Know Where You Are in House of Cards, Netflix Technology Blog (Jan. 27, 2015), https://netflixtechblog.com/netflixs-viewing-data-how-we-know-where-you-are-in-house-of-cards-608dd61077da.

[51] https://help.netflix.com/en/node/10421.

119. Netflix's business is a subscription service model that offers personalized recommendations, to help its subscribers find shows and movies of interest to them using a proprietary recommendations system.[52]



120. The Netflix service controls provision of its media content streaming service to a user's device based on the profile corresponding to the user. In addition to choosing which titles to include in the rows on the user's Netflix homepage, the Netflix system also ranks each title within the row, and then ranks the rows themselves, using algorithms and complex systems to provide a personalized experience. Netflix does this so that when a user looks at their Netflix homepage, Netflix's systems have ranked titles in a way that is designed to present the best possible ordering of titles that the user may enjoy. For example, "[i]n each row there are three layers of personalization: the choice of row (e.g. Continue Watching, Trending Now, Award-Winning Comedies, etc.), which titles appear in the row, and the ranking of those titles. The most strongly recommended rows go to the top. The most strongly recommended titles start on the left of each row and go right . . ."[53]

[52] https://help.netflix.com/en/node/100639.

[53] *Id.*

121. The Netflix service updates the user's profile based on the provision of the media content streaming service to the user's device. For example, Netflix estimates the likelihood that the user will watch a particular title in its catalog based on a number of factors including: the user's "interactions with our service (such as your viewing history and how you rated other titles)."[54] Netflix further explains, "In addition to knowing what you have watched on Netflix, to best personalize the recommendations we also look at things like: the time of day you watch, the devices you are watching Netflix on, and how long you watch."[55]

122. In addition, Netflix supports streaming on different devices. If users have more than one Netflix-compatible device, the user can switch devices at any time.[56] While Netflix's membership plan determines the number of screens a user can watch at the same time, it does not restrict the number of devices a user can associate with their account.[57] If the user wants to watch on a new or different device, they simply sign in to Netflix on that device.[58] In such a case, the Netflix service receives login information corresponding to the first user from a second computing device. Similar to the steps described above, the Netflix service identifies the first user based on the login information received from the second computing device, retrieves the updated user configuration information corresponding to the first user, and controls provision of the media content streaming service to the second computing device based on the updated user configuration information corresponding to the first user.

[54] *Id.*

[55] *Id.*

[56] https://help.netflix.com/en/node/102377

[57] *Id.*

[58] *Id.*

123. Netflix directs and controls the relevant actions of its subscribers through the Netflix application and service. For example, Netflix controls the operation of the Netflix application, forbids users to alter its programming,[59] and takes measures to ensure that Netflix content is only accessible via the Netflix application. Thus, Netflix conditions the streaming of its video content upon performance of the steps of the '938 Patent and establishes the manner or timing of that performance. Since Netflix is in control of the operation of the Netflix application and the Netflix service, Netflix has the right and ability to stop or limit infringement of the '938 patent, and thus infringes vicariously by profiting from the direct infringement.

124. Through the operation of its adaptive streaming technology, Netflix has infringed and continues to infringe at least Claim 1 of the '014 Patent. That infringement has caused and continues to cause damage to Avago, and Avago is entitled to recover damages sustained as a result of Netflix's wrongful acts in an amount subject to proof at trial.

PRAYER FOR RELIEF

For the reasons stated above, CA and Avago respectfully request that the Court enter judgment in their favor and against Netflix:

1. Declaring that Netflix has directly infringed one or more claims of the Patents-in-Suit in violation of 35 U.S.C. § 271;

2. Enjoining Netflix from further infringing '098, '014, and '938 Patents;

3. Ordering that CA and Avago be awarded damages in an amount no less than a reasonable royalty for each asserted patent arising out of Netflix's infringement of

[59] For example, Netflix subscribers agree not "to decompile, reverse engineer or disassemble any software or other products or processes accessible through the Netflix service; insert any code or product or manipulate the content of the Netflix service in any way." See https://help.netflix.com/legal/termsofuse.

the Patents-in-Suit, together with any other monetary amounts recoverable, such as treble damages;

4. Declaring that this is an exceptional case under 35 U.S.C. § 285 and awarding CA and Avago their attorneys' fees and costs;

5. Ordering that Netflix is required to pay exemplary damages under 35 U.S.C. § 284;

6. Awarding pre-judgment and post-judgment interest and costs against Netflix; and

7. Awarding the Broadcom Entities such other and further relief as the Court deems just and proper.

JURY DEMAND

CA and Avago demand a trial by jury of all claims in this action so triable.

Respectfully submitted,

/s/ *Bruce S. Sostek*

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